

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 2910
MSDS Number: 2910
SRM Name: Calcium Hydroxyapatite

Date of Issue: 24 May 2004

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Description: Standard Reference Material (SRM) 2910 is intended primarily for use in evaluating the physical and chemical properties of calcium apatites of biological, geological, and synthetic origins. SRM 2910 is a high purity powder form of calcium hydroxyapatite with crystal sizes of about 0.1 μm to 0.5 μm . A unit of SRM 2910 consists of 2 g of material.

Substance: Calcium Hydroxyapatite

Other Designations: Calcium Hydroxyapatite (hydroxyapatite; calcium phosphate hydroxide; calcium phosphate tribasic; tricalcium phosphate; calcium orthophosphate, basic)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EC Number (EINECS)	SRM Nominal Concentration (mass %)
Calcium Hydroxyapatite	1306-06-5	215-145-7	100

3. HAZARDS IDENTIFICATION

Health Hazard: No significant target effects reported for calcium hydroxyapatite. May cause irritation upon short-term exposure to the eyes and respiratory tract when inhaled. For additional information on toxicity, refer to Section 11.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> </u>	<u>X</u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>	<u>X</u>
By the Occupational Safety and Health Administration (OSHA)	<u> </u>	<u>X</u>

4. FIRST AID MEASURES

Skin Contact: Remove contaminated clothing and shoes. Wash skin with soap and water for at least 15 minutes. Obtain medical assistance, if needed. Clean contaminated clothing before reuse.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing by qualified personnel. Get immediate medical attention.

Ingestion: If a large amount is swallowed, obtain immediate medical assistance.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Calcium hydroxyapatite is a negligible fire hazard.

Extinguishing Media: Use extinguishing media that is compatible for the surrounding material and fire.

Fire Fighting: Move container from fire area if possible without exposure to risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus.

Flash Point (°C): Not applicable. Method Used: Not applicable.

Autoignition Temperature(°C): Not applicable.

Flammability Limits in Air (Volume %): UPPER: Not applicable.

LOWER: Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Collect spilled material in appropriate container for disposal.

Dispose of following section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Store SRM 2910 with the cap tightly closed under normal laboratory conditions of temperature and humidity. Keep separated from incompatible substances.

Precautions for Safe Handling: See Section 8: “Exposure Controls and Personal Protection”.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Hazardous Component	Exposure Limits
Calcium Hydroxyapatite	No occupational limits established.

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: For conditions of frequent use or heavy exposure where exposure is apparent and engineering controls are not feasible, respirator protection may be needed. Refer to the “NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84” for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near areas of use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Calcium Hydroxyapatite	
Appearance and Odor: White, powder, crystal solid form. Odorless	Solvent Solubility: Soluble in acidic solutions. Insoluble in organic solvents and in buffer solution with pH 5 to 10.
Molecular Weight: 1004.69	Water Solubility: Insoluble.
Theoretical Molecular Formula: $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$	Ca/P Molar Ratio: 1.664
Density: 3.18 g/cm ³	

10. STABILITY AND REACTIVITY

Stability: X **Stable** **Unstable**

Stable at normal temperatures and pressure.

Conditions to Avoid: None reported.

Incompatibility (Materials to Avoid): Calcium hydroxyapatite is incompatible with acids.

See Section 5: "Fire Fighting Measures".

Hazardous Decomposition or Byproducts: Miscellaneous decomposition products.

Hazardous Polymerization: **Will Occur** X **Will Not Occur**

11. TOXICOLOGICAL INFORMATION

Route of Entry: X **Inhalation** **Skin** **Ingestion**

Toxicological Data

Rat, Oral LD₅₀: >25 350 mg/kg

Mouse, Subcutaneous LD₅₀: >19 850 mg/kg

Mutagenic Data

Mammal Lymphocyte, DNA Adduct: 200 mg/L

Health Effects (Acute and Chronic): Acute exposure to calcium hydroxyapatite may cause irritation to the mucous membranes and eyes. There is no data available for chronic exposure.

12. ECOLOGICAL INFORMATION

Adverse Effects: Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103: Not regulated.

SARA Title III Sections 302, 304, 313: Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: No.

CHRONIC: No.

FIRE: No.

REACTIVE: No.

SUDDEN RELEASE: No.

OSHA Process Safety, California Proposition 65: Not regulated.

CANADIAN REGULATIONS

WHMIS Classification: Not determined.

EUROPEAN REGULATIONS

EC Classification: Not determined.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Hydroxyapatite*, 19 March 2003.
SRM 2910; *Calcium Hydroxyapatite*; National Institute of Standards and Technology, U.S. Department of Commerce: Gaithersburg, MD (2003).

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.